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ABSTRACT

This learning module provides students with practice in applying algebraic operations to vocational agriculture. The module consists of unit objectives, definitions, information, problems to solve, worksheets suitable for various levels of vocational agriculture instruction, and answer keys for the problems and worksheets. This module, which covers linear equations, provides practice in using equations to solve farm problems such as balancing a ration for three kinds of farm animals, and computing hours worked. (KC)

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LINEAR EQUATIONS

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TEACHING UNIT: **LINEAR EQUATIONS**

TEACHING ACTIVITY: Solving stated problems

UNIT OBJECTIVES: (1) To provide experiences which will enable students to develop an understanding of how to use basic computational skills to solve problems with linear equations.

(2) To present arithmetic concepts of working with linear equations in a manner keeping with the interest of Vocational Agricultural students.

DEFINITIONS:

VARIABLE - A symbol which may represent any member of a specific set of numbers or values. Alphabetical letters like "A", "B", "C", "X", "Y", and so on, are often used as symbols to represent numbers in the process of finding the value of an unknown quantity or variable.

CONSTANT - A variable with just one value. Any real number is a constant because it represents a specific value.

REAL NUMBER - Any number which is a positive number, a negative number, or "0".

LINEAR EQUATION: Any equation equivalent to one of the form $Ax + By = C$, where "A", "B", and "C" are real numbers with "A" and "B" not both "0". If the equation was graphed, it would be a straight line.

TRANSFORMATION PROPERTIES OF EQUALITY:

(a) Addition Property of Equality: If "a", "b", and "c" are any real numbers such that "a=b", then "a+c = b+c" and "c+a = c+b". For all real numbers "a" amd "b", (a+b) + (-b) = a.

(b) Rule for Subtraction: For all real numbers "a" and "b", "a-b = a + (-b)". To perform a subtraction, replace the number you are subtracting by its opposite, and add.

(c) Multiplication Property of Equality: If "a", "b", and "c" are any real numbers such that "a=b", then "ac = bc" and "ca = cb". For all real numbers "a" and all non-zero real numbers "b", "1÷b (ba) = a".

(d) Rule for Division: For all real numbers "a" and all non-zero real numbers "b", "a ÷ b = a x 1÷b". To perform a division, replace the divisor by its reciprocal and multiply.

RECIPROCAL - Two numbers whose product is "1" are call reciprocals of each other. The reciprocal of "a" is 1÷ a".

NAME _____

INSTRUCTIONS: SOLVE THE FOLLOWING PROBLEMS.

NOTE: In solving an equation, any changes may be made that do not destroy the equality between the terms of the equation. The following operations may be used in solving an equation with each operation resulting in a new equation whose two sides are equal:

(a) Addition of the same number or expression to each side.
(b) Subtraction of the same number or expression from each side.
(c) Multiplication of each term of the equation by the same number.
(d) Division of each term of the equation by the same number.

EXAMPLE - The temperature outside has fallen 14 degrees since noon. The present temperature is 24 degrees. What was the noon temperature?

If "b" represents the noon temperature, then "b - 14" represents the present temperature.

"b" - 14 = 24
"b" - 14 + 14 = 24 + 14
"b" = 38 The noon temperature was 38 degrees.

1. After selling 412 bushels of corn, farmer Jones had 670 bushels left. How many bushels did he start with? _____ bushels.

2. Curing meat should be stored in an environment with a temperature of 20 degrees celsius. Use the equation (F = 9C÷5 + 32) to determine the corresponding Fahrenheit temperature.

_____ degrees Fahrenheit.

3. The width of a farm wagon bed is 5 feet 6 inches shorter than its length. The width is 75 inches. How long is the wagon bed?

_____feet _____inches.

4. During the Summer, Mary and Donald worked in the School greenhouses for their Supervised Occupational Experience Programs. Mary worked 4 times as many hours as Donald and they worked a total of 1960 hours. How many hours did each work?

Mary worked _____ hours. Donald worked _____ hours.

5. Mrs. Smith has her fifth period horticulture class divided into small groups. Group one, which consisted of Billy, John and Sue were asked to transplant tomato plants. Billy planted twice as many as Sue and she planted twice as many as John. How many plants did each student plant if the group planted a total of 210 plants?

Billy planted _____ Sue planted _____ John planted _____

6. A farmer sold 12 truck loads of soybeans and four truck loads of wheat to the local grain elevator. The total amount of soybeans and wheat was 8320 bushels. If the total cash receipt $ 42,640 and the wheat sold for $ 3.10 per bushel and the soybeans sold for $ 5.80 per bushel, how many bushels of each type of grain did she sale?

Soybean = _____ Wheat = _____

7. Sonya has one beef steer and one market hog which she keeps records on for her Supervised Occupational Experience Program. If the steer weighs five times as much as the hog and the combined weight of the two animals is 1308 pounds, how much does each animal weigh?

Steer = _____ pounds Hog = _____ pounds

8. How much would ryegrass seed cost per pound if a 50 pound bag of mixed lawn seed cost $ 56 and consisted of 60 percent fescue which cost $ 1.20 per pound and 40 percent ryegrass?

Ryegrass cost $ _____ per pound.

NAME _____

WORKSHEET

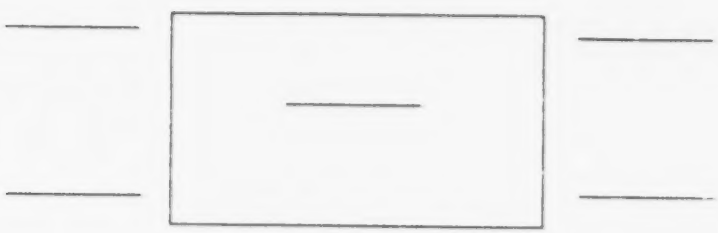
COURSE: **Agricultural Production III**

COMPETENCY: **#004 - "Balance a ration for three kinds of farm animals"**

INSTRUCTIONS: Complete the following problems.

1. Formulate a feeder pig ration that contains 16% protein using corn (9% protein) and soybean meal (44% protein).

2. Formulate a ration for a lactating dairy cow containing 18% protein using corn silage (8% protein) and soybean meal (44% protein).



3. Formulate a ration for a steer requiring 7% protein using corn-and-cob meal (5% protein) and alfalfa hay (12% protein).

ANSWER KEY FOR MODULE TITLED "LINERAR EQUATIONS"

MODULE TRAINING UNIT:

(1.) 1082 (2.) 11' 9" (3.) 68 (4.) Mary = 1568 Donald = 392
(5.) Billy = 120 Sue = 60 John = 30 (6.) Soybeans = 6240 Wheat = 2080
(7.) Steer = 1090 Hog = 218 (8.) $ 1.00

Competency #004 Worksheet:

(1.)

Corn 9 — 28 parts corn

16

Soybean Meal 44 — 7 parts Soybean Meal

35 parts total

28/35 = 80% Corn 7/35 = 20% Soybean Meal

(2.)

Corn Silage 8 — 26 parts Corn Silage

18

Soybean Meal 44 — 10 parts Soybean Meal

36 parts total

26/36 = 72.2% Corn Silage 10/36 = 27.8% Soybean Meal

(3.)

Corn and Cob Meal 5 — 5 parts Corn and Cob Meal

7

Alfalfa Hay 12 — 2 parts Alfalfa Hay

7 parts total

5/7 = 71.4% Corn and Cob Meal 2/7 = 28.6% Alfalfa Hay